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Notice of Allowability	Application No.	Applicant(s)	
	10/082,085	AUGSBURG ET AL.	
	Examiner	Art Unit	
	Barry J. O'Brien	2183	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *new application filed on 2/25/2002*.

2. ☒ The allowed claim(s) is/are *1-16*.

3. ☐ The drawings filed on _____ are accepted by the Examiner.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6. ☒ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☒ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date 20040722.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date 20020225 .
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date *20040722* .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

RICHARD L. ELLIS
PRIMARY EXAMINER

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Scott Reid on 7/22/2004.

The application has been amended as follows:

Amendments to the Specification:

2. On page 1, line 7, please replace "Serial No. _____ (Attorney Docket No. RPS920010176US1) entitled "Efficiently Calculating a Branch Target Address" filed on _____" with --Serial No. 10/082,144 entitled "Efficiently Calculating a Branch Target Address" filed on 2/25/2002--.

3. On page 4, line 5, please replace "U.S. Application Serial No. _____ filed on _____, entitled "Efficiently Calculating a Branch Target Address," Attorney Docket No. RPS920010176US1" with --U.S. Application Serial No. 10/082,144 filed on 2/25/2002, entitled "Efficiently Calculating a Branch Target Address,"--.

4. On page 6, line 4, please replace "U.S. Application Serial No. _____ filed on _____" with --U.S. Application Serial No. 10/082,144 filed on 2/25/2002--.

5. On page 9, line 22, please replace "U.S. Application Serial No. _____ filed on _____" with --U.S. Application Serial No. 10/082,144 filed on 2/25/2002--.

6. On page 10, line 22, please replace "U.S. Application Serial No. _____ filed on _____" with --U.S. Application Serial No. 10/082,144 filed on 2/25/2002--.

7. On page 12, line 15, please replace "U.S. Application Serial No. _____ filed on _____" with --U.S. Application Serial No. 10/082,144 filed on 2/25/2002--.

Amendments to the Claims

8. Please replace claim 1 with --A method for utilizing bits in an illegal op code in order to not increase the number of bits required to represent each instruction comprising the steps of:

fetching a plurality of instructions from a memory;

re-encoding one or more illegal op codes of one or more instructions into a single illegal op code if said one or more instructions comprise illegal op codes that are a member of a group of illegal op codes;

pre-decoding a fetched instruction that ~~does not have an illegal~~ has a legal op code; and

re-encoding the legal op code and one or more fields of said pre-decoded instruction into a previously illegal op code which was re-mapped into said single illegal op code.--

9. Please replace claim 5 with --A processor, comprising:

an instruction cache configured to fetch a plurality of instructions; and

a logic unit coupled to said instruction cache configured to re-encode one or more illegal op codes of one or more instructions into a single illegal op code if said one or more instructions comprise illegal op codes that are a member of a group of illegal op

codes, wherein said logic unit is further configured to pre-decode a fetched instruction that ~~does not have an illegal~~ has a legal op code, wherein said logic unit is further configured to re-encode the legal op code and one or more fields of said pre-decoded instruction into a previously illegal op code which was re-mapped into said single illegal op code.--

10. Please replace claim 9 with --A processor, comprising:

means for fetching a plurality of instructions from a memory;

means for re-encoding one or more illegal op codes of one or more instructions into a single illegal op code if said one or more instructions comprise illegal op codes that are a member of a group of illegal op codes;

means for pre-decoding a fetched instruction that ~~does not have an illegal~~ has a legal op code; and

means for re-encoding the legal op code and one or more fields of said pre-decoded instruction into a previously illegal op code which was re-mapped into said single illegal op code.--

11. Please replace claim 13 with --A system, comprising:

A memory configured to store instructions,

An instruction cache coupled to said memory, wherein said instruction cache is configured to fetch a plurality of instructions from said memory,

A logic unit coupled to said instruction cache configured to re-encode one or more illegal op codes of one or more instructions into a single illegal opcode if said one or more instructions comprise illegal op codes that are a member of a group of illegal op codes, wherein said logic unit is further configured to pre-decode a fetched instruction that ~~does~~

~~not have an illegal~~ has a legal op code, wherein said logic unit is further configured to re-encode the legal op code and one or more fields of said pre-decoded instruction into a previously illegal op code which was re-mapped into said single illegal opcode.--

Drawings

12. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "additional pre-decoded information comprises a carry-out field" as recited in claims 3, 7, 11 and 15, as well as the "carry-out field is associated with a fetched branch instruction" as recited in claims 4, 8, 12 and 16, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

13. The drawings are objected to for the following reasons:

a. Figure 3, Reference Numeral 309, appears to contain a typographical error. Please replace the phrase "Store re-encoded pre-coded instruction in instruction cache" with --Store re-encoded pre-decoded instruction in instruction cache--.

14. Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief

description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

15. The following is an examiner's statement of reasons for allowance: The prior art of record has taught the detection of instructions containing illegal opcodes, and the subsequent re-encoding of the illegal opcodes into a known opcode that represents instructions containing illegal opcodes (see Black et al., U.S. Patent No. 5,619,408), as well as replacing the illegal opcodes with valid micro-operations (see Lin et al., U.S. Patent No. 5,881,279). The prior art of record has also taught the pre-decoding of instructions and the subsequent storing of pre-decode information in locations other than in the instruction cache with the pre-decoded instructions (see Tran, U.S. Patent No. 6,122,729 and Green, U.S. Patent No. 5,951,671). Furthermore, the prior art of record has taught the pre-decoding of instructions and uses the pre-decode information to re-encode the instruction to include a computed target address (see Witt, U.S. Patent No. 6,457,117). However, no prior art references, or combination of references, of record has taught the re-encoding of illegal opcodes into known "illegal" opcodes and the subsequent re-encoding of the known "illegal" opcode, replacing the known "illegal"

opcode with a new opcode and pre-decode information from another fetched instruction that contained a legal opcode.

16. It was also noted that the claimed invention omitted an essential element that was necessary for the invention to operate as described in the specification, namely the inclusion of the legal opcode when re-encoding the one or more fields of the pre-decoded instruction into the previously illegal opcode that was re-encoded. However, after the above Examiner's Amendment, the claims are more clearly recited, with the metes and bounds of the claim more clearly defined and positively recited (see attached Interview Summary). Thus in view of the above Examiner's Amendment, the claims are allowable over the prior art of record as no prior art of record or any combination of the prior art of record has taught the limitations of the claims.

17. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Barry J. O'Brien whose telephone number is (703) 305-5864. The examiner can normally be reached on Mon.-Fri. 6:30am-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Chan can be reached on (703) 305-9712. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

19. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Barry J. O'Brien
Examiner
Art Unit 2183

BJO
7/23/2004

RICHARD L. ELLIS
PRIMARY EXAMINER